

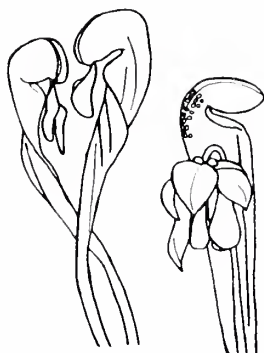
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CARNIVOROUS PLANT NEWSLETTER

VOLUME 14, Number 4

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CARNIVOROUS PLANT NEWSLETTER

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COVER: *Pinguicula macroceras* in habitat near Gasquet, California.

Photo by Jim Miller

The co-editors of CPN would like everyone to pay particular attention to the following policies regarding your dues to the ICPS.

All correspondence regarding dues, address changes and missing issues should be sent to Joanne Klingensmith, 437 Las Rindas, Fullerton, CA 92635. **DO NOT SEND TO THE CO-EDITORS.** Checks for subscriptions and reprints should be made payable to ICPS.

All material for publication, comments and general correspondence about your plants, field trips or special noteworthy events relating to CP should be directed to one of the co-editors. We are interested in all news related to carnivorous plants and rely on the membership to supply us with this information so that we can share it with others.

Views expressed in this publication are those of the authors, not necessarily the editorial staff.

Copy deadline for the June issue is April 1, 1986.

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NEWS AND VIEWS

BRUCE LEE BEDNAR (12731 SW 14th Street, Miami, FL 33184). In an article I wrote for CPN, 12 (3), 1983, "*Nepenthes mirabilis* Variation," I said that *N. smillessii* is a *N. mirabilis* with a new name. The truth is just the opposite. *N. smillessii* is an old synonym used back in 1895 to describe *N. mirabilis*. See "The Nepenthaceae of Netherland Indies," by B.H. Danser.

Also, in a News and Views CPN 11 (1), 1982, I reported on a "safe" population of dwarf *Sarracenia* $\times$ *formosa* just 40 miles west of Perry, FL. Last season it was bulldozed and drained after lumbering and is now completely destroyed.

BRUCE ALSO WRITES:

Late in July I revisited Everglades National Park which is in south Dade County, west of Florida City. I discovered a fairly sizable population of *Pinguicula pumila* growing practically lithophytic on damp oolite in a water saturated area in full sun. All the plants were $\frac{1}{2}$ to $\frac{3}{4}$ inches in size and none had flowered. The butterworts grew only on the west side of a hardwood hammock as you enter the park on Hwy. 27. The plants were on both the north and south sides of the road. I thought this locale might be of interest as it's the farthest south I've ever seen *Pinguicula* grow.

BOB HANRAHAN (P.O. Box 70513, Marietta, GA 30007). Over the years I have been fortunate to have had the opportunity to converse with a multitude of collectors. Most recently, I have detected an attitude change from the conservation minded collectors of the past to the newcomers of today. This change irritates me as I consider myself primarily a conservationist and then a propagator to obtain the former's goals. Specifically, the new attitudes seem to revolve around the following thoughts.

- 1) There seems to be less concern for plant conservation and more for individual plant ownership. Collectors will now buy material from known field collectors rather than wait for commercial production.
- 2) Collectors seek plants they are ill-equipped to grow. For example: highland, alpine and even many Mediterranean plants will not proliferate in sub-tropical climates without special environmental features not found in hobby greenhouses.
- 3) Hobbyist wants all plants to be "cheap." If based on orchid rarity comparisons, CP should be priced at 5 to 10 times their current catalog prices. *Heliamphora* at \$100.00 per plant is a low price when one considers their extreme rarity. *Nepenthes* should be selling for \$25.00 to \$200.00 each depending on variety, size and difficulty of breeding stock acquisition.
- 4) Many collectors do not understand the pure economical reasons why every CP variety is not available from a retail nursery. It has now become far too easy to lay down a few dollars and buy a plant than it is to seek out and contact other collectors and arrange a trade. In addition, some collectors are only interested in extremely rare plants now listed within CITES and protected by regulations for commercial trade.

STEVE SMITH (Rt. #1 Box 32-G-3, Climax, NC 27233) P.S. - In the June 1985 issue of CPN the article, "Pest Control," by Kathleen Rutkiewics should be followed by a disclaimer stating that Safer's Insecticidal Soap *should NOT* be used on *Sarracenia*, *Darlingtonia*, or *Heliamphora* or the results will be disastrous. The soap will destroy the pitchers it comes into contact with. It works great otherwise.

JOE MAZRIMAS reports that the San Francisco Fair Flower Show which was held Aug. 23-25, had eight exhibitors showing about 60 CP. The display this year was held in the central hall and was built around a spectacular swamp or bog atmosphere. The exhibitors were: Mike Morris, Larry Logoteta, Joe Mazrimas, Terry Fish, Marc Stephenson, Louise Avila, Ray Triplitt, and Mickey Urdea. The "Best of Show" award went to Louise Avila for the spectacular *Nepenthes truncata* plant. The Brisbane CP Society award for the best Australian plant shown at the show was awarded to Mickey Urdea for his outstanding *Drosera adelae* plant which grew to a diameter over 12 inches or 30 cm. Congratulations to everyone for a fine showing and a big thanks to Anthony Rea for working so hard on making all the arrangements and having the show become a great success. The large crowd of people around our display all weekend long was reassuring to us. We hope to do even better next August. All CP growers living in the bay area around S.F. are welcome to join us next year. Watch this space for an announcement! (See photos next page.)

Probably, most of you have noticed that the 1986 subscription price for CPN remained the same. This situation is not accidental but is the result of many factors and subscribers who contribute a little extra to our effort. With the threat of a significant postage increase that may hit us at some future date, along with increases in printing our journal, we feel lucky at this time that we can maintain the same subscription rate for another year.

The main reason that we can maintain our subscription rates year after year is the income we earn from the Seed Bank, personal advertising and now commercial advertising. We hope to see each of these ventures increase in use in the near future and this is where you, the reader, can help us out. We would like to see more use made of the Seed Bank both in donations and purchases. We like to see more use of the personal classified section especially by newer subscribers. Lastly, if

you work in or know of a commercial firm that does business related to plants, please inform them that we accept advertising at reasonable rates. All the income derived from these sources goes to the production of your newsletter and offsets, at least so far, the increased costs that inch upward every year.

IVAN SNYDER (110 Meyer Court, Hermosa Beach, CA 90254). Thank you for the letter you sent me in regard to my article on VFT evolution and your reference to *Drosera* 'falconeri.' I did not know about this sundew before you wrote to me. When I wrote the article, I felt that the sundew-VFT intermediate had become extinct, but what you have written makes me think otherwise. This has really got me interested in this mystery plant as you called it. Someday, I hope to see this plant rediscovered because it would be a good experiment to try and hybridize *D.* 'falconeri' and VFT together. This would prove their relationship if it worked but probably wouldn't due to their separate integration and distant location from one another. Still, it would be fun to try! REFERENCE: CPN 9 (2): 46-48 1980.

NEIL MORRISON (2818 Little John, San Antonio, TX 78209). My recent trip to Florida was very interesting because I was looking for *Sarracenia minor*. I took a train into the Pine Barrens to see if I could find one. Well, I didn't find any because I found out later that the severe winters here may have killed those that were growing in the wide open spaces. When I visited Sea World, we took the 12 noon tour, and I finally found a real south central Florida pine forest. I tried to find *S. minor* but what I did find was *Utricularia intermedia* or *U. foliosa*. Some day, I will find *S. minor* since I have a very good idea where to look.

ALAIN CHRISTOPHE (37, Avenue Turgot, 77330 Ozoir-la-Ferrière, FRANCE). I'm starting a new business of selling rare seed of CP. Right now I have eight species of South African CP. Send \$7s (\$1 U.S) for my list.



N. truncata, "Best of Show".



Louise Avila and Tony Rea (rt.).

San Francisco Fair Flower Show.

Photos by Joe Mazrimas



Mickey Urdea with Brisbane CP Society Award.

BRUCE PIERSON (P.O. Box 179, Albion Park, NSW 2527 AUSTRALIA) writes: I also have the yellow flowered *S. leucophylla* that has no red on the pitchers. I would say that it is the same clone as your (Joe Mazrimas') plant, as I got it from a friend of mine who had obtained it from Steve Clemesha. I remember Steve telling me later that he had obtained it from either you or Don earlier, and that it had been collected because it was so light coloured, and the yellow flower was only seen at a later date. I have a particular interest in anything that is a little different and try to look for these differences in my seedlings of species that I grow from seed.

From the one batch of seed, I have about 10 *S. minor* that are a little different in the angle and shape of the hood, and in the colouring, mainly of the hood, and in the areolea. I also have a variety of *S. purpurea* ssp. *venosa* that were grown from the one batch of seed, which show slight differences

in the shape, veining and colour of the plants. There is also a difference in the prominence of the downward pointing hairs inside the hood, and the hairiness of the outsides of the pitchers.

I will be interested to hear more on the variations of species, especially in relation to my hairy *S. leucophylla*. It is interesting to note that you have mentioned that the narrow mouth is characteristic of *S. alata*, *rubra*, etc., whereas Don has indicated that he thinks there may be a *purpurea* in the plant.

I have another rather technical question that someone may be able to answer. What are the mathematical odds of just one feature of a distant back-cross being carried over through several future crosses, so that we end up with a *S. leucophylla*, for example, with a pubescent exterior, or a yellow flower? They must be in the millions to one against such an occurrence, especially when it is considered that in a primary hybrid of *S. alata* × *leucophylla*, it would be very rare indeed to find a yellow flower, and in a primary hybrid with *S. purpurea* ssp. *venosa* and *S. leucophylla*, it would be hard to find a plant that is actually hairier than the parent *S. purpurea* ssp. *venosa*. It is a very complex situation.

BRUCE ALSO WRITES:

A few months ago, I had a mini-invasion of insects in my *Nepenthes* section. This was caused by the fact that I had placed into that section a new plant which contained larvae of a small fly. The first indication of the infestation was the total destruction of a *Drosera petiolaris* that was in the section. The plant had been totally eaten from the roots upwards, and by the time I noticed it, there was nothing left but the ends of the leaves.

After throwing this pot out, I suddenly noticed that a newly planted *N. khasiana* from tissue culture had also been annihilated. Over the next few days, I noticed quite a few of these small insects flying around in this section, and fearing a major catastrophe, I decided to take drastic action to eliminate the pests before they eliminated my plants.

I obtained a bottle of 'MALDISON 50', and mixed up enough of this chemical to

treat all the plants in this section. I first gave all the pots a heavy soaking with the mixture, then sprayed all the plants thoroughly, and finally sprayed a very fine mist into the air from outside the section, so as not to poison myself in the process. The following day, there was no sign of the insects at all. I have previously had a small amount of trouble from these pests, but up until this time, they have only attacked *Pinguicula*, and I was rather surprised to find that they had attacked a *Drosera*, and more surprised to find that I had also lost a *Nepenthes*.

Under normal circumstances, I usually spray any new plants on arrival with an insecticide and a fungicide. However, on this occasion, I was busy with a project, and I neglected to spray the plant on arrival, having hurriedly potted it, and placed it in this section. I find that it is a good idea to treat any newly acquired plants on arrival, in case of any insects or fungus that may be present in the peat or on the plants. Anyone who does not like using poisons on their plants can simply wash the plants thoroughly to remove any unwanted pests that may be present. Fungal spores may still persist, so a light spray with a fungicide would probably be advisable.

Growers certainly don't send other people pests on purpose, but there are the odd occasions when a few larvae or eggs may be present with a plant, so it is always a good idea to be on the safe side when introducing new plants into your collection.

BRUCE PIERSON (P.O. Box 179, Albion Park, N.S.W. 2527, Australia) says: In CPN 14(2), p. 50, mention was made of a possible new variety of *S. leucophylla*. The view was advanced that this plant may be a variation resulting from a series of back-crosses commencing with a primary hybrid between *S. leucophylla* and *S. purpurea* ssp. *venosa*, which then continued to be back-crossed with *S. leucophylla*, until the resulting plant was produced. While this may be the case, I find it very difficult to comprehend that all traces of *S. purpurea* ssp. *venosa* would vanish, except the hairiness of this ssp.

Mention is very often made of genetic variation that results from the different

AN UNUSUAL *MIRABILIS* PLANT!

by Bruce Lee Bednar, 12731 SW 14th Street, Miami, Florida 33184

Up until now *Nepenthes* flowers have always been male or female. As I said "up until now." This season we recorded one of the first true hermaphroditic *Nepenthes*. A green *Nepenthes mirabilis*, imported out of Thailand back in 1978, became very big for us each year but refused to flower. Finally, after seven years, it produced what appeared to be a typical male flower arrangement. The stalk had some twenty male flowers. After a week, four of them produced a stigma in the center of the anthers and self pollinated. The anthers then enlarged to become ovaries. Four seed pods developed fat and green, a true morphadytic plant!

Unfortunately, I was in the hospital for a week and the *Nepenthes mirabilis* did not get water at all. The lower leaves as well as the flower stalk turned brown, and the

seeds were still too immature to expect any germination. Perhaps better luck next season. (Photo by B. Bednar.)



S. leucophylla (Hairy)

Photo by B. Pierson and Ron Mirande.

combination of genes in a species; however, when a plant turns up that may be a result of this variation, it is quite often assumed that this plant is a result of distant hybridization with another species. If this is the case, then is *S. rubra* ssp. *wherryi* also considered to be a variety which has been formed in the same way, by a series of back-crosses? I also have in my collection a *S. rubra* ssp. *rubra*, which is slightly pubescent, although nowhere near as much as the *S. leucophylla* which is hairier than any *S. purpurea* ssp. *venosa* in my collection, or any that I have seen anywhere else.

Should it be assumed that *S. purpurea* is the only *Sarracenia* which is allowed to have a pubescent variety, and that any other *Sarracenia* species which has a pubescent variety show up from time to time cannot be a real variety, but is only the result of a distant back-cross with *S. purpurea* ssp. *venosa*? Is it actually possible that *S. purpurea* ssp. *purpurea* may be the result of a distant back-cross between *S. purpurea* ssp. *venosa* and another of the upright species, that has become a new variety, and been

SEED BANK

Patrick Dwyer (St. Michael's Episcopal Church,
49 Killeen Park, Albany, NY 12205)

Cost per packet: \$.75 each.

Darlingtonia californica; *Drosera adelae* (4), *Drosera aliciae*, *D. anglica* (5), *D. auriculata*, *D. binata*, *D. brevifolia*, *D. burkeana* (10), *D. burmannii*, *D. capensis*, *D. capensis* (narrow), *D. capensis* mix, *D. capillaris*, *D. cuneifolia* (1), *D. dielsiana*, *D. erythrorhiza*, *D. glanduligera*, *D. indica*, (10), *D. indica* (Australia) (10), *D. intermedia*, *D. macrantha* (pink fl.), *D. macrophylla* (4), *D. montana*, *D. montana* (white fl.) (10), *D. natalensis* (7), *D. nitidula* (5), *D. pel-tata*, (13), *D. planchonii*, (10), *D. pulchella* (7), *D. pygmaea*, *D. rotundifolia*, *D. rotundifolia* (forked stalk) (10), *D. spathulata* (6), *D. spath.* (Formosa) (10), *D. spath.* (Kansai), *D. spath.* (Kanto) (10), *D. spath.* (Tanega) (5), *D. spath.* (white fl.), *D. stolonifera*, *D. trinervia* (10), *D. villosa* (3), *D. whittakeri* (10); *Drosophyllum lusitanicum* (13); *Nepenthes albomarginata*, *N. fusca* (10), *N. sp.* (Sumatra) (5); *Pinguicula agnata* (5), *P. alpina* (15), *P. caerulea* (4), *P. grandiflora rosea*, *P. ionantha* (1), *P. moranensis* (10), *P. pumila* (1), *P. vulgaris* (1), *P. vulgaris* bicolor (10); *Polypompholyx multifida* (10); *Sarracenia alata*, *S. flava*, *S. flava* (many color variants), *S. flava* (red tube/green lid) (2), *S. flava rugella* (3), *S. flava* (green) (10), *S. leucophylla*, *S. leuco.* (tall thin red) (10), *S. purpurea purpurea*, *S. purp. purp.* (N.C.), *S. purp. purp.* (Alabama) (4), *S. rubra jonesii* (7), *S. rubra wherryi* (5), *Sarr. hybrid mix.* *S. flava/leuco.* (10), *S. rubra gulf/leuco.* (2), *S. oreo/alata* (10), *S. purp. × flava* (5), *S. alata/minor* (8), *S. purp. ven-osa/leuco.* (10), *S. leuco. × alata* (2), *S. (purp. × flava) × alata* (3), *leuco/minor × psitt/oreo* (5), *S. psitt* (giant) *× flava* (red tube/green lid) (3), *S. psitt* (Theodore, Alabama) *× flava* (red tube/green lid) (3), *S. pitt.* (Nicholas, Miss.) *× flava* (red tube/green lid) (3), *S. psitt.* (Theodore, Alabama) *× flava rugellii* (3); *Utricularia capensis* (15), *U. gibba* (1), *U. lateri-flora*, *U. pentadactyla* (5), *U. subulata* (5), *U. uliginosa* (10).

For details on sending or ordering seed,
see CPN, September, 1985, page 61.

N & V (continued)

isolated by climatic changes in the far distant past? The pitchers are much narrower than ssp. *venosa*, and this could have resulted from the same back-crossing mentioned.

To get back to the original subject, I have enclosed a photo of my *S. leucophylla* hairy form. It was taken approximately 18 months ago. It is clear from the photo that the exterior of the pitcher is quite hairy. This plant was one of the first of the *Sarracenia* that I started my collection with, but I did not notice the difference in it until some time after I had obtained it. I have since located a few more hairy plants amongst my seedlings; however, these are still small as yet.

Last year, my four largest clones of this plant flowered for the first time. I selfed one of these plants, and have planted some of the seeds. They have germinated, but are still very tiny, so it is too early to say whether the offspring will maintain the hairiness of their parent. I have also made a few hybrids with this plant, so I will be interested to see if any of these are also hairy.

While I am not an expert on *Sarracenia*, I do consider it possible for there to be hairy variants of species other than *S. purpurea*. I would be very interested to hear more on this subject from others who would know more about these variants.

Nepenthes × *hybrida* and *Nepenthes* × *sedinii*

by Bruce Lee Bednar, 12731 SW 14th Street, Miami, FL 33184

Nepenthes × *hybrida* and *N.* × *sedinii* are the same cross of doubtful parentage, and used in the making of many complex hybrids during the late 1800s. Back in the early days of *Nepenthes* horticulture, the main problem that occurred was positive identification of separate valid species was not always made. Some species of *Nepenthes* went under an array of names, or (were) not named at all due to the fact that many were so similar looking. Much confusion occurred between *N. mirabilis* (which has petiolate leaf to stem arrangement), *N. khasiana* (slightly petiolate to decurrent), *N. distillatoria* (decurrent), *N. gracilis* (decurrent) and *N. hirsuta* (amplexicaul).

Dominy and Sedin, it is speculated, contributed to make these hybrids. Being friends, one probably had the female plant and the other supplied the pollen in an early joint effort to create new material. Seed germinated and was divided between the two growers and two hybrids were named, one by each of the men. Sedin named his hybrid after himself, *N.* × *sedinii*, and Dominy chose *N.* × *hybrida*. These crosses were made prior to 1865 and Masters did the descriptive work to be published. The original paper suggests the cross was "*khasiana* × *gracilis*?" At that time *N. phyllamphora*, *N. distillatoria* and *N. khasiana* were all names to describe *N. mirabilis*. I feel the *N. khasiana* they refer to is indeed *N. mirabilis* because the description for *N.* × *hybrida* reads that the leaves were decurrent (like in *gracilis*) and semi-petiolate (like in *mirabilis*), elongated and slightly lanceolate (as in *gracilis*). If they had *N. khasiana* properly labeled at that time, which I doubt, then it too would fit into this descriptive category. I must point out that *N. distillatoria* has decurrent leaves and could easily have been the *N. gracilis* they mention. *N. hirsuta* is out being the

only one of the above with amplexicaul leaf to stem and the fact that *N. hirsuta* is very hairy and that carries over into offspring hybrids at a reduced rate, yet no printed material mentions *N.* × *hybrida* or *N.* × *sedinii* having such a texture. *N. mirabilis* has petiolate leaves and evidence leans toward both hybrids being a *N. mirabilis* hybrid. *N. mirabilis* not only fits the descriptions; a more positive fact is that in living material today, plants that were crossed with either hybrid bear lacinate leaf edge margins on pitcherless leaves. This is a genetic trait handed down to all *N. mirabilis* hybrids; none other of the above plants has this obvious characteristic.

So we have crosses of doubtful parentage most likely being *N. gracilis* × *N. mirabilis* as we can be certain that *N. mirabilis* is one of the true parents. If *N.* × *hybrida* and *N.* × *sedinii* is not a *N. (gracilis*

N. × *hybrida*



× *mirabilis*) cross, it would be a *N. (distillatoria* × *mirabilis*) cross and certainly not a *N. (khasiana* × *gracilis*) cross. Although *N. distillatoria* is still a possibility instead of *N. gracilis*, nothing written or living can confirm it. Unfortunately, all we have left today are hybrids that were crossed with *N. × hybrida* and *N. × sedinii*. Both are now extinct. The familiar so-called "*N. × hybrida*" is simply a mislabeled *N. alata*

green form, crowned a hybrid accidentally two decades ago.

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200 MILES WITH MELLICHAMP

J.C. MOORE, SR., 112 Deborah Dr. E., Mobile, AL 36619

It was August 4, 1985, when Dr. Mellichamp and Steve Broyles arrived in Mobile and called me from the motel that they were ready to see great fields of CP. Within an hour, we were on our way to the nearest CP stand.

It was like a football game with numbers being called out rapidly and recorded just as rapidly. When I finally regained my equanimity, I realized that measurements were being taken which sounded just like a good old football game. Each day we travelled fast and far so that each minute was utilized in the field. We travelled as far west as Gulfport, Mississippi, northward about 100 miles, and finally eastward to the Crestview-Defuniak Springs, Florida area. It was a seemingly endless zig-zag pattern. Although almost every location had been previously mapped, one or two we had to skip because of lack of time. By taking shortcuts when possible, we found several totally unrecorded areas.

Temperatures soared well above 100°F for several days and we were blessed with a cooling shower almost every afternoon. Humidity in the field exceeded the temperature until it rained. In the evening when we crossed the Mobile River, the steaming fog held to the tops of the forest like clouds in a South American forest, a haunting reminder that we were in the very limits of the tropical-temperate zone.

We obtained specimens for propagation, hybridization and herbarium use.

Almost every field boasted at least two species and numerous hybrids in various stages of interbreeding. Often, there were more hybrids than pure species. Fortunately, we got a fleeting glance at a snake and evidently it was late to a meeting and did not so much as tip his hat as he hastened away. We were constantly plagued by red-bugs and ticks but only once did we encounter a group of carnivorous mosquitoes. They were starving when we stopped and overweight when we left. Every repellent we used was a wasted investment, and only a sauce for the mosquitoes.

On an interesting rest stop at the Perdido Vineyards in Alabama, we watched a 15-minute filmstrip and tasted the fine wines made from the native muscadines, one of which is the Rose Cou Rouge.

We met Ms. Beverly Bottoms in southern Baldwin Co., a new and very enthusiastic ICPS member who lives in Mobile. On one of our excursions, I was so tired that I waited in the van while Beverly, Larry and Steve dove into a cane-break fifteen to 20 feet tall. We had been sniffing out *S. leucophylla* × *S. flava* for quite some time. Suddenly, my hair stood straight up as I heard a lot of loud yelling and screeching. I grabbed the "judge" (a 44 magnum pistol) and forgetting my troubles, I plunged through the cane and briar to the rescue. I could envision my friends up a tree and a 300-pound black bear daring them down. To my relief, I



Field of *Sarracenia leucophylla* and *S. leucophylla* $\times$ *S. flava*. Baldwin Co., AL.



Mixed population of *S. leucophylla* and spectacular hybrids with "cut-throat" *S. flava*. Baldwin Co., AL.

Photos by J.C. Moore

saw everyone huddled around a colony of typical Gulf coast *S. flava*. A specimen was taken for pressing and confirmation.

If these plants were the hybrid, *S. flava* × *leucophylla*, they would be easily identified by the first spring tube and the last seasonal tube. It looks like almost all white with a good *S. flava* stripe across the throat while another form looks like *S. flava* with a very dark splotch in the throat but exhibits numerous small, light windows in the hood and tube.

These tubes, both types, do not trap insects; but the best trapping tubes are those with rich color form of *S. leucophylla*. There is much introgression involving both species.

Sarracenia alata, a very light yellow-green form has been noted in the mid western area of Baldwin Co., but there is no point where the two species (*S. alata* and *S. flava*) overlap. Many hybrids exist with *S. purpurea* and *S. psittacina* with *S. leucophylla* being the great adultress of them all. One would suspect that *S. leucophylla* would be all green with pale yellow flowers and total lack of anthocyanins. More mysteries abound: how did *S. alata* extend itself almost 75 miles across Mobile Bay and why do some Mobile Co. *S. leucophylla* have some *S. flava* shapes?

Sarracenia purpurea was observed in SE Jackson Co., Mississippi, and due north in Wayne Co. It's interesting that none have been found between these two points until well inside of Mobile Co. There is a gap in the range for *S. purpurea* although the habitats are liberally sprinkled with *S. alata*, *S. leucophylla*, *S. psittacina* and *S. rubra* ssp., a very hardy and prolific plant.

Our travels continued on to Crestview Florida area, noting along the way the copper-form of *S. flava*. (This writer is convinced that Copper *S. flava* is a form of *S. leucophylla* hybridization.) These forms are varied and beautiful and usually no two are alike; one particular field seemed to be devoid of *S. leucophylla* and *S. purpurea* and yet there were quite a few hybrids between the two. Moving further

east to Niceville-Crestview area, we found an isolated area of *S. flava* var. *maxima* that I and someone else had knowledge about. We located the prized *S. flava maxima* and a hybrid of *S. purpurea* × *S. flava maxima* (*S. × catesbaei* "maxima") that I had kept well hidden for several years. The large size of this hybrid is living proof that this strain of *S. flava maxima* is genetic. Only *S. flava* and *S. minor* are the two forms that pass the "maxima" influence on to their offspring.

One notable fact is the variation found in *S. psittacina*. Numerous colonies can be found that are all green with yellow sepals, varying degrees of bloom stem length, pink-and red-petaled, large and small head and wide and narrow wing. None of these characteristics can be attributed to environment (water or sunlight).

In general, none of the *Sarracenia* was in excellent condition and almost none of the hybrids had bloom stalks. The two Siberian blasts of cold arctic air, well below freezing temperatures, laid every field of *Sarracenia* low just before bloom season. This was followed by a very long drought. One- and two-year-old seedlings did not survive and flowering was reduced by 75%. Hopefully, a few well managed fires and a mild winter will allow a bountiful crop next year.

We all enjoyed the entire trip and I especially enjoyed our coined phrases of "Sinonyms, Antinymys, Homenymys and Omenanymys." Mrs. Moore (My Rib) and Ms. Bottoms prepared us a dinner of seafoods cooked every known style and we "pigged out" two nights.

On one occasion I attempted to pin down Dr. Mellicamp to a positive "yes" or "no" concerning the correct taxonomic identification of a group of plants. When he got through explaining the "Ifs-and-buts" and other evasions, I knew that he was not going to commit himself at that time. He did, however, properly affix the carrot dangling before my nose so I would keep on exploring, and we all agreed that all coo-coos are not found in clocks!

SUMATRAN EXPEDITION

JANUARY 1985

by Greg Russell, 71 Melrose Drive, Flindersview, Queensland, 4305, Australia

It is difficult to describe the elation I felt as the Qantas 747 lifted off from Brisbane. What made the trip so enjoyable was the knowledge that within a few days, my friends and I would be trekking in the remote Sumatran jungles. The first week my wife, Lea, and I spent shopping and sight-seeing in Singapore. One trip to Sentosa Island, a tourist attraction in Singapore Harbour, rewarded us with the discovery of *N. rafflesiana* and *N. gracilis* growing near Fort Siloso. Lea returned to Brisbane, and on the following morning, I flew out to Jakarta.

I had not been to Jakarta before and my first impression when stepping from the air-conditioned comfort of the plane into the thick, humid atmosphere is that it hits one like a hot, wet blanket. Fortunately, the customs and immigration checks were quick and I was met outside the terminal by Roger and Marjan Shivas who had arrived from Perth. The three of us had spent the previous twelve months planning, by cor-

respondence, our expedition to Sumatra. It was great to be together again and ready to commence the expedition that we had worked towards for so long.

The rest of the day was spent taking in the sights of Jakarta. The next afternoon we left by bus to travel north through Java, then across the Sunda Straits and along the Trans Sumatran Highway to the Padang Highlands. The 42 hour bus journey is an exciting trip and one not easily forgotten. Rice paddies, tropical jungles, screaming monkeys, exotic birds, and a foreign culture and traditional architecture of the villages that we passed made the trip one of the highlights of our expedition. An overcrowded bus, sleepless nights, unfamiliar food and the occasional breakdown were small prices to pay.

On our arrival in Bukittinggi we found accommodation and made arrangements to climb Mt. Sago (2,762 m). The following

As a matter of clarification, Gulf coast bogs do not quake; you do the quaking! Our CPs thrive best where water bubbles up from subsurface streams, usually via crayfish holes. We call this type of water flow "artesian", and often it has a sulfurous odor. Where the subsoil water is not present, CPs are scattered and depend on rainwater and the sponge-like action of the soil. Rabies in the native animal population is common and to be feared.

I had a wonderful time, and if I ever recover I will write again about the *Drosera* and *Pinguicula* in the same area.

Dr. T.L. Mellichamp is an associate Professor of Biology, University of N. Carolina at Charlotte. A quiet and reserved person in public and an overgrown "Teenager" when in the field, he has a mesmeric attitude that totally captures heart and soul of his students; he

is the typical "absent-minded Professor."

Mr. Steve Broyles is a graduate student at the University of Georgia at Athens. Steve is quite serious and business-like, very observant, sharp-minded as a razor blade and will hopefully be one of our future botanists. He is a former student of Dr. Mellichamp's. When in the "field" working, there is no play; and when he relaxes, that is also total, thoroughly enjoying himself at leisure time. An up-and-coming "Southern Gentleman" of the First Water. This young man I predict will be one of our most knowledgeable and respected Botanist-Biologists for the future. Dr. Mellichamp is very fortunate to have Steve for assistant, but I am the most fortunate in having the pleasure of observing them work together. I look forward to the next expedition. (See p. 102 for additional photos.)



N. treubiana, lower pitchers. Near Sibolga.



N. treubiana, upper pitcher. Near Sibolga.



N. carunculata, lower pitcher, found on Mt. Sago.



N. treubiana, intermediate pitchers. Near Sibolga.

Photos by Greg Russell.



N. singalana, upper pitcher. Mt. Singgalang.



N. singalana, lower pitcher. Mt. Sago.



N. singalana, peristome of lower pitcher. Mt. Sago

morning we woke at 5:30 a.m., eagerly looking forward to our first climb and hopefully our first Sumatran pitcher plant. After a short drive to the base we started our climb. The conditions were not ideal for the first few hours and intermittent rain made the journey rather uncomfortable. Four hours later we found *N. gymnamphora* growing in an exposed area on the trail. The first notable feature is the small lanceolate leaves compared to the size of the pitchers on the rosette plants. The rosette pitchers were ovate with an oblique mouth. The peristome was flat and finely toothed on the inner margin. The pitchers were green with purple spots covering the outside and the peristome was green. No upper pitchers were found although one female plant was found in seed.

After another half hour climb we found a plant that we at first believed to be *N. pectinata*. The description in Danser's monograph describing the lower and upper pitchers of the plants that we found were quite different. The upper pitchers resembled Danser's description of *N. carunculata*. Locating this species made the planning and physical hardships of our trip all worthwhile. The lower pitchers were 20 cm high and cylindrical in shape with 4 cm wide finely ribbed peristome. After taking photographs and collecting some seed we started our descent, arriving back at our hotel just after dark. That night we were joined by the fourth member of our party, Moya Tomlinson, who had just spent three months in China traveling.

The next two days were spent resting and arranging our climb up Mt. Singgalang (2,877 m). Mt. Singgalang is very steep and treacherous, and an extremely difficult climb. *N. gymnamphora* was found just off the trail. Three hours later we reached an open area where we rested and took in the view of Mt. Merapi and surrounding mountains. We continued on for another hour before reaching the summit where there is a crater lake surrounded by dense moss forest. In this moss forest a small population of *Nepenthes* was found. The plants appeared to be *N. singalana*. The peristomes did not fit

the description of *N. singalana* but we are convinced it is.

Our evenings were spent in one of two local coffee houses that served European and Indonesian meals as well as cold beer. Most tourists who travel in Sumatra pass through Bukittinggi and eat in these coffee houses. The market place in Bukittinggi is one of the largest in Sumatra and it was an experience to spend a couple of hours there. All the equipment needed for an expedition (jungle knives, backpacks, clothes and food) can be purchased here at reasonable prices.

A second attempt was made to reach the summit of Mt. Sago. We left Bukittinggi early in the morning for Parambang where we started our climb. After walking for an hour through the rice paddies we found the jungle path and started our ascent. The jungle is a beautiful place with its birds, monkeys, squirrels and insect life. Walking amongst the trees, orchids, hoyas, impatiens, palms and vines made our climb an adventure in itself. *N. gymnamphora* and *N. singalana* were found near the summit. On both climbs of Mt. Sago we saw signs of tigers. We were later informed by the local people that there were tigers in the area and that there had been three recent attacks on nearby villages.

That night we decided to forego our plans of climbing Mt. Merapi and instead the next day we left for Padang and from here we travelled fifteen hours by bus to Sungaipenuh, the largest town in the vicinity of Mt. Kerinci (3805 m).

Mt. Kerinci is in the centre of a large National Park and a permit is required to enter the park. After a further 2 hours by opelet we reached a village at the base of Mt. Kerinci where we stayed at the National Park headquarters. Mt. Kerinci is an active volcano which last erupted in 1958. Setting out at 3 a.m. with a park ranger we reached the summit ten hours later. The view was spectacular—crater lakes, tea plantations, rice paddies and mountainous countryside stretching to the coast.

During the climb, one *Nepenthes* was found by the trail. This plant resembled the plants found on Mt. Singgalang. It was the only *Nepenthes* found although a large population could be seen growing high up in the tree tops on another spur across a deep ravine. We could not reach them from where we were so identification was impossible. This was a big disappointment considering the time and effort we had put into getting to and climbing Mt. Kerinci.

In Padang we arranged a trip for the next day to Mt. Talang (2,597 m). Right from the start we were troubled by leeches, as we had run out of repellent we had no choice but to put up with them. The trail that we chose was not well used and soon turned into an impenetrable jungle. However, we found a large population of a very red form of *N. gymmophora* as well as one plant of *N. carunculata* that was found growing on an exposed ridge. Unfortunately, our schedule did not allow us time to make another attempt on the summit. We left Padang by plane for Medan the following day.

Medan is typical of most large Indonesian cities: very crowded and tiring, compounded by the strange and dangerous driving habits of the Indonesians. Our stay in Medan was brief and within the hour we were on a bus bound for Prapat, a town situated on the shores of Lake Toba. Lake Toba is 80 km long and 26 km wide. In the middle of the lake is Samosir Island. It is a fantastic sight with its steep pine covered slopes sweeping down to the blue-green water of the lake.

At Prapat we were joined by Martin Shiva, an experienced traveller in this part of the world, who joined us for the rest of the trip. After hiring transport we started out for Sibolga, a town on the west Sumatran coast. *Nepenthes tobaica* grows abundantly along the roadside around Prapat. Near Sibolga *N. gracilis*, *ampullaria*, *alata*, *reinwardtiana* and *N. treubiana* were found. *N. treubiana* is a striking plant with distinct lower, intermediate and upper

pitchers. Seed of these species was collected. The Sumatran form of *N. alata* has no glandular crest and at first we were doubtful of the identity of this species. However, Macfarlane described this plant (refer Danser's monograph) as not always having a keel.

The next morning was spent exploring the roadside and that afternoon we returned to Prapat where we parted. Roger, Marjan, Moya and Martin left for a week's rest on Samosir Island and then to Mt. Sinabung, while I packed my bags and headed for home.



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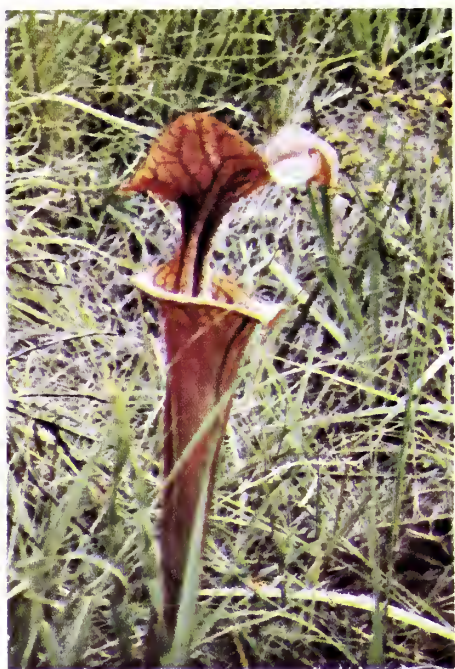
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Sarracenia flava "copper top" in a population of *S. leucophylla* and hybrids near Milton, FL.

Photo by J.C. Moore



Steven Broyles with a collection of tubes of *Sarracenia alata* showing varying color forms.

Stone Co., MS. Photo by Larry Mellichamp.



Steven Broyles in field of *S. flava*, with a few *S. leucophylla* and *S. purpurea*. Near Milton, FL.

Photo by Larry Mellichamp.

Review of Recent Literature

Beaver, R.A. 1985. Geographical variation in food web structure in *Nepenthes* pitcher plants. *Ecological Entomology* 10:241-248.

The species of the genus outlying from the epicenter in West Malaysia have less diversity in the overall food web, including species trapped and predators living in them. These differences seem related in a complex way to the size of the island or country inhabited by the species.

Bunn, Eric. 1985. Micropropagation of *Byblis gigantea*. *Australian Horticulture* 83:102-103.

The author describes propagation of the species by using explants (e.g., shoots, apical meristems, etc.) and tissue culture with details of the medium and treatment of the explants and resulting plantlets. A useful article for those planning to tissue culture the species, and the rest of us for knowing that it is possible and may be a source of commercial plants one day. DES

Herrick, Sophie B. 1877. Insectivorous plants. *Scribner's Monthly* 13:804-815.

Yes, the year of publication above is correct! This older summary article has the charm and tendency to wordiness with a dash of philosophy typical of natural history writing of the Victorian era. The author pretty well summarizes most of the genera although the *Sarracenia* are given short shrift. This is because she clearly has derived nearly all her information for the article from Darwin's book of the same title. Still, the article is interesting reading, and the line drawings are pleasing.

Roberts, D.A., Singer, R. and Boylen, C. The submersed macrophyte communities of Adirondack Lakes (New York, USA) of varying degrees of acidity. *Aquat. Bot.* 21(3):219-236 1985.

The dominant species in the upstate New York lakes were several *Utricularia* species being the major component of

the bottom cover.

Saikawa, M. and C. Morikawa. 1984. Electron microscopy on a nematode-trapping fungus *Acaulopage pectospora*. *Can. J. Bot.* 63:1386-1390.

This is one of the terminal knob trapping species of carnivorous fungi and the authors describe electron microscopic features of the knob and its internal structures before and during phases of a trapping episode, including the structural nature of the adhesive.

Sasago, A. and T. Sibaoka. 1985. Water extrusion in the trap bladders of *Utricularia vulgaris*: II. A possible mechanism of water outflow. *Bot. Mag.* 98:113-124.

The authors studied water intake and extrusion in the traps with application of various chemical solutions including sucrose, KCN, sodium azide, etc. Their results indicate that the bulk of water outflow after trap springing took place by flow of sap through the cells with water extruded to the outside by hydrostatic pressure resulting in resetting, the process requiring energy from respiration.

Toivonen, H. Changes in the pleustophytic macrophyte flora of 54 small Finnish lakes in 30 years. *Ann. Bot. Fenn.* 22(1):37-44 1985.

A census of 10 lake plants in 54 lakes indicates that *Utricularia vulgaris* and *U. minor* have declined due to the excessive eutrophication in some lakes. Some of this decline was due to the heavy shading effect of a high production of phytoplankton.

REMINDER

All routine correspondence regarding your subscription should be addressed to Joanne Klingensmith, ICPS business manager, c/o The Fullerton Arboretum, Fullerton, CA 92634. Items of a more urgent nature should be sent to her home: 437 Las Riendas, Fullerton, CA 92635.

Victorian Carnivorous Plant Society Show—The Beginning

by David Bond, Gordon Cheers and Sam Gilmour

SETTING UP

Place: The Herbarium

Time: 3 p.m., on the 8th day of March, 1985.

Tables and chairs began to mysteriously move around the hall, trestles started to appear and deposit themselves in places where someone was bound to fall over them. Plants started to fill the trestles willy-nilly, only to suddenly reappear on the floor as the trestles were covered with black cloth.

Unfortunately, things did not come together so easily without quite a deal of human effort. It took a small group of people approximately six hours to get the hall looking reasonable, ready for the 9 a.m. start on Saturday.

After much discussion (and some dispute), we arranged five long benches filled with plants, terrariums, a peat garden, a slide show area, a demonstration area, a propagation tank and two sale tables.

THE SHOW

The most controversial point of the whole show—the judging—took place early Saturday morning, and took approximately 70 minutes. Trophies were placed next to the prize-winning plants as the public, frothing at the mouth, began to beat down the doors. It was our first show as a society, and was timed for the Saturday and Sunday of the Labor Day long weekend. And what a show it was! With great weather and many other Moomba activities close by, people were out and about. From young children to grandparents, even a busload of university students, all came to our doors, bribed their way in (\$1 for adults, 50 cents for children and members), and proceeded to enjoy themselves.

EVENTS

Slides showing plants in their natural habitats were shown continuously, and lectures and demonstrations were given at regular intervals. And thank God for all the chatterboxes we have in the society—they really made the day. Visitors would not have been half as enthusiastic if our members hadn't been so friendly, co-operative and full of information. As for the visitors themselves, many came prepared with loaded cameras and questions that revealed that maybe they are beginning to know the difference between fact and fantasy regarding our plants.

DISPLAYS

There were some excellent terraria on display, ranging from Sam's precious humicrib for *Nepenthes* to one specialising in *Drosera* from all over the world, and other natural-looking ones with a mixture of CPs amongst rocks and bogs. One even had its own aquatic section containing *Utricularia*. Yet another enthusiastic grower had planned a range of CPs in a bottle on its side.

The bog garden was one of the main attractions and contained over 100 plants arranged with the smallest in the front and the tallest *Sarracenia* at the back—not very novel, but quite showy. The sphagnum was mostly contained to within the garden area. Many people spent a lot of time contemplating the garden, trying to count the species. . . . We had rigged it so that the more one looked, the more one found. Towards the front of the bog was an aquatic *Utricularia australis* in flower, plus many small *Drosera*.

Other interesting displays were bowl arrangements, one, in a shallow tray, look-

(Continued on page 109.)



Victorian (Australia) C.P. Society 1985 Show.

Photo by David Bond.

Nepenthes × *dominii* and var. *intermedia*

by Bruce Lee Bednar, 12731 SW 14 St., Miami, FL 33184

Nepenthes × *dominii* was the first man-made *Nepenthes* hybrid crossed by Dominy around the late 1850s, and was first exhibited at the Royal Horticultural Society show at South Kensington in June of 1862. A few years later, a sleek clone was given a variety name of *intermedia* by Court, a close friend of Dominy. The descriptions for print of both plants was written by Veitch and go something like this: Stem purplish, slightly downy, leaves are lanceolate and 16-18" x 3", one nerved, decurrent and petiolate. Pitchers up to 6", lid spotted, high neck peristome, lid faintly flushed above and freely spotted below. Much more green on pitcher than red. The descriptions for both plants are almost identical and Veitch mentions they are a favorite of easy culture.

N. × dominii was the beginning of the man-made hybrid area in this field opening the door for future works. Finding out quickly that hybrids were fertile and capable of hybrid crossing, multi-parent stock could be created. This was an instant stimulant to collectors to produce new material as getting specimens from the wild was still very difficult during those times. Many of the early hybrids made proved to be heartier than many of the wild forms.

Since it was still very early in the "Victorian" age of *Nepenthes*, a number of collected plants that were very similar (small, greenish and unattractive) were not noticed and remained in greenhouse collections unnamed or unidentified for years. They were not considered of any use to hybridizers due to their "common" appearance.

The original plants (both male and female) of *N. × dominii* and var. *intermedia* have survived until modern times. After many years of lack of interest and neglect, *N. × dominii* var. *intermedia* simply became known as *N. × intermedia*. Today, I've seen both clones in collections under an array of erroneous names such as *N. × hookeriana-cult.*, *N. × balfouriana* (now extinct) *N. × boissiensis* and *N. × courtii*, all being the same plant. To make the problem worse, a few field collected natural hybrids of *N. gracilis* × *N. rafflesiana* have had the title of *N. × dominii* placed upon them. This is, of course, totally improper.

Today's *N. × dominii* and var. *intermedia* fit the original description and line drawings; they are often hard to get to pitcher, needing more humidity than most, and much less light as well. These freely vining plants are very hearty and can handle cool weather better than most *Nepenthes* hybrids and species; perhaps this is why these clones survived all these years when many others died out.

The main problem with *N. × dominii* and var. *intermedia* is that the parent crossed with *N. rafflesiana* is not certain. The original description says "*Nepenthes rafflesiana* breed with a common Bornean species, possibly *N. gracilis*." However, today many natural hybrids (as well as man-made ones and backcrosses) between *N. rafflesiana* and *N. gracilis* are in cultivation. None is similar to *N. × dominii* at all. Perhaps the Bornean species was *N. mirabilis*, again many field-collected natural hybrids, backcrosses and man-made material fail to look even close to *N. × dominii*. The leading characteristic that *N. mirabilis* carries over into its many hybrids is the lacinate leaf edge margins, always visible at least on pitcherless leaves and is not in the make-up of *N. × dominii* at all. It has been said that this *N. × dominii* has *N. ampullaria* in its make-up and is a *N. × hookeriana*. In the 150 years since this cross, no other *N. rafflesiana* × *N. ampullaria* cross, man-made or natural, has looked like *N. × dominii*. When *N. × dominii* was made, *N. × hookeriana* was still

considered a species. Not until 1908 was it thought of as a natural hybrid. Line drawings of those times indicate that the *N. × hookeriana* "Victorian" was the same as the field collected specimens we have now. So now we must consider what other non-attractive Bornean *Nepenthes* species could have been used in that cross back then. Veitch, when describing the plants for print, questioned the *N. gracilis* parentage. Knowing Dominy and what was available at that time, he speculated that *N. hirsuta* was used. I must totally agree with this; there are many *N. hirsuta* characteristics in *N. × dominii* and var. *intermedia*, and *N. hirsuta* has never again been crossed with *N. rafflesiana*. So further proof would involve making this cross again in the greenhouse and checking for rather obvious similar looking offspring. *N. × dominii* and var. *intermedia* have the ability to survive in the cooler conditions and lower light levels in which *N. hirsuta* is found in the wild. The shape of the hybrid's pitcher is a half way step between *N. rafflesiana* and *N. hirsuta* and is fuzzy, like *N. hirsuta*. The stem of the hybrid is purplish and has a fine hairy texture as in *N. hirsuta*, but reduced. The leaves are large and very much like *N. rafflesiana*, with the presence, again, of a hairy texture like in *N. hirsuta* but reduced. With all plants considered, *Nepenthes × dominii* and var. *intermedia* appears to be a *N. rafflesiana* × *N. hirsuta* cross. Now all we need do is duplicate the hybrid and prove it.

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DROSERA CAPENSIS - AN UNUSUAL CRESTATE FORM?

by Steve Boddy, 2312 Anndel Court, Grove City, Ohio 43123

After reading Bob Hanrahan's article in the June issue of CPN, I thought this item might be an interesting follow-up.

Several months ago, another grower sent me two small *Drosera capensis* (narrow leaf) plants that were supposed to be "crestate." The plants did not look unusual but were supposed to develop the crestate tendencies as they matured. I planted the two specimens in a tray of sphagnum with a few other *Drosera* and waited. Weeks went by and the plants grew normally except for a slight "waviness" of the leaves.

Finally after three months, I pretty much gave up on the idea of the plants

ever becoming "crestate." I took several leaves from each to cut up for propagation purposes and pulled up the two plants. (I intended to cut up the roots also for propagating since I had only a few *Capensis* plants at the time.)

Much to my surprise, the roots were "crestate"! (See photo.) After taking several photographs, I snipped off a couple of the roots for propagating and repotted the plants. Both the leaf and root cuttings are starting to bud but it is much too soon to guess whether the new plants will again have "crestate" roots. Perhaps this time the *leaves* will show this abnormality.



Drosera capensis with crestate roots.

Photo by Steve Boddy.

Evolution of the Venus Fly Trap

(Ivan Snyder, 110 Meyer Court, Hermosa Beach, CA 90254)

In this article I will demonstrate how I believe the Venus Fly Trap evolved to its present form from a noncarnivorous plant.

There are plants which are capable of capturing insects though they are not carnivorous, and they do so unintentionally. These plants have sticky gland-tipped hairs which they use to discourage plant-eating animals. Insects alight on them and become ensnared by the adhesive substance. Plants with glandular hairs are common in a large number of plant families. An example I have grown and observed capture very small insects is *Mimulus pilosus*, a member of the family Scrophulariaceae. Many plants of this family are glandular pubescent, and some are quite viscid. The glandular secretion of these plants is chemically similar to the sticky trapping mucilage of carnivorous plants.

Probably the first truly carnivorous plant evolved from a glandular pubescent bog inhabiting plant by one simple change. A mutation occurred which relocated a gene that controlled the manufacture of protein dissolving enzyme to the glandular hairs. This gene was originally expressed in the seed, where the embryonic plant used the enzyme to break down food sources stored in the endosperm. With this adaption the plant can digest as well as capture insects. Insects are trapped in the sticky mucilage and their soft tissues are dissolved by enzyme and flow out over the leaf surface where they are absorbed by the same principle as foliar feeding. This gives the plant a greater advantage in a bog environment where available nutrients are low. With time, following generations develop stickier secretions and produce digestive substances better upon the capture of insects. Separate glands which produce enzyme only, resting on the leaf surface, develop from the mucilage glands. This first carnivorous ancestor of the Venus Fly Trap (fig. #1) may have looked similar to a butterwort. The fami-

lies *Droseraceae* and *Lentibulariaceae* must have had a parallel evolution in their beginnings.

The next evolutionary step toward the Venus Fly Trap is the plant's ability to bend its leaves and cup them around captured prey. This mechanism was adapted from the plant's ability to bend toward light. Instead of bending in response to light, the leaves can also bend with the detection of protein. At this same time, the plant evolves tentacles which developed from modification of the glandular hairs. The glandular hairs became larger in size and acquired the bending ability in response to tactile stimulation. With tentacles and curling leaves the plant has now become a sundew, the direct ancestor of the Venus Fly Trap. (fig. #2)

The next development is bending ability of the sundew leaf centered along the leaf midrib. This was beneficial for capturing larger prey, and following generations perpetuated this trait and evolved faster closing leaves (fig. #3). The traps became quick enough so that the plant no longer needed tentacles. But with modification the tentacles became trigger hairs on the inner surface of each lobe, and tentacles on the outer edge developed into the trap cilia to bar the escape of insects. The glands which were atop the tentacles now rest on the inner surface of the trap, no longer making sticky mucilage to trap, but still produce digestive fluid when insects are trapped. With these adaptations the once sundew can now be recognized as a Venus Fly Trap (fig. #4), though there are still more devices this plant can use.

Now that the trap is cleared of tentacles, a new advantageous change can take place. Another translocational mutation occurred which gave some of the glands in the trap the ability to produce nectar. This trait was originally present in

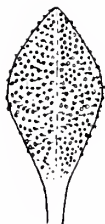


fig. #1

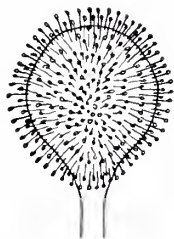


fig. #2



fig. #3

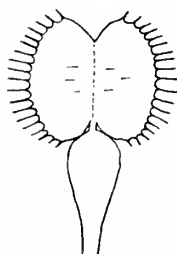


fig. #4

Drawings by Ivan Snyder.

the nectaries within the flower parts. With this desirable genetic accident the plant became able to attract insects. An additional attractant which developed is more pigment in the trap. The trap entices insects by mimicking a flower with bright color and sweet nectar.

Literature Cited

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VCPS Show (from p. 101)

ing like a carnivorous bonsai, with small specimens of *Sarracenia*, *Pinguicula*, *Drosera* and *Dionaea*.

THE SALE TABLE

After seeing how easy it was to divide *Nepenthes* and *Sarracenia*, a surprising number of people were prepared to try to grow some species of these. The sale table was simply swamped after each demonstration. This could point to the fact that

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for all the talking and reading about plants, the "hands-on" approach is the one that really gets results.

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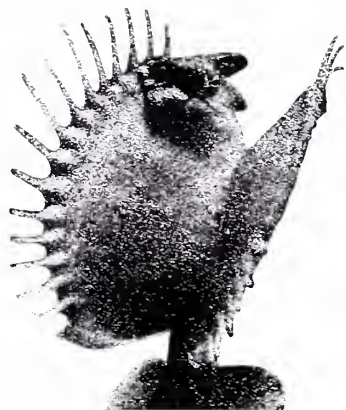
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